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October 17, 1990

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SUPERFUND BRANCH

Ms. Mary Kay Voytilla
Work Assignment Manager
U.S. Environmental Protection Agency
Region 10, Superfund Branch
1200 6th Avenue
Seattle, WA 98101

Subject: Proposed Omission of Tilling and Discing
ARCSWEST Contract No. 68-W9-0060
Work Assignment 60-03-0LF3
Ruston/N. Tacoma RI/FS

Mary Kay:

As we discussed earlier, the Feasibility Study document being prepared for the Ruston/North Tacoma Superfund Site is a "living" document in the sense that the approach it presents can and will undergo changes throughout the preparation process. It has recently been determined that sufficient information exists to propose the omission of tilling and discing from further detailed evaluation. The rationale for this omission can be summarized as four items:

- Tilling and discing does not meet any of the three CERCLA objectives (i.e., reducing the mobility, volume and toxicity of contaminants).
- Tilling and discing has the potential to increase the volume of contaminated soil (by mixing contaminated soil with uncontaminated soil).
- Tilling and discing is only effective in reducing surface contaminant concentrations if the underlying soils are lower in concentration. Recent soil analysis data indicate approximately half of the surface soil at the site is underlain by material containing higher contaminant concentrations.
- A review of remedial actions that have been selected at other Superfund sites has not revealed any precedent for the use of tilling and discing.

We believe that the items listed above are sufficient justification to discontinue our evaluation of tilling and discing. Please let us know if you concur with our rationale. We would then revise the screening of technologies section of the FS to reflect elimination of tilling and discing.

Please do not hesitate to call me at (415) 768-7256 if you have any questions or comments.

Sincerely,



Greg Haskins
Project Manager



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020

November 16, 1990

Ms. Mary Kay Voytilla
Work Assignment Manager
U.S. Environmental Protection Agency
Region 10, Superfund Branch
100 4th Avenue
Seattle, WA 98101

Subject: ARCSWEST Contract No. 68-W9-0060
Work Assignment 60-03-0LF3
Ruston/N. Tacoma RI/FS
Proposed Omission of Tilling and Discing From FS

Dear Mary Kay:

As stated, we have evaluated further our rationale for omitting Tilling and Discing from a detailed evaluation. Our rationale was previously summarized as four items in our October 17, 1990, memorandum and is expanded below. A fifth reason for omitting tilling and discing has also been described below.

1. **CERCLA Objectives** - Tilling and discing as a separate technology does not meet any of the three CERCLA objectives of reducing mobility, volume, and toxicity of contaminants.

Mobility and toxicity at the Ruston site are largely related to the transportation of soil particles to which contaminants have adhered. The use of tilling to reduce mobility and subsequent toxicity could be enhanced by using common agents or binders such as portland cement, lime kiln dust, or a lime/fly ash mixture. However, the use of these agents is essentially identical to stabilization/solidification technology which was determined in Letter Report 1 to be inappropriate for in-situ remediation of residential areas. The resulting hardened soil would be incompatible with existing landscaping and vegetation growth.

The use of tilling to provide in-situ mixing of the reagents currently under consideration for the soil washing treatability study would not be applicable to the Ruston site. The addition of these reagents would increase the mobility of soil contaminants. It would be impractical to contain or recover the contaminated wash solutions.

The reduction in volume of contaminants is discussed below in Item 2.



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Potential Increase in Volume - Mixing contaminated surface soil with uncontaminated subsurface soil may result in a more uniform distribution of contaminants and may decrease contaminant concentrations in potential hot spots. However, on a mass balance, the amount of contaminants would not be decreased. Additionally, tilling could potentially increase the total volume of soil with arsenic concentration above a specified action/clean-up level by mixing contaminants into previously uncontaminated or less contaminated soils.

To illustrate, assume the action/clean-up level is 150 ppm and the arsenic profile is 420 ppm, 100 ppm, and 80 ppm for surface, 6 inch and 12 inch depths, respectively. Before tilling and discing, only the top 6 inches of soil would be above the action/clean-up level. After tilling and discing, the entire 12 inches of soil could be above the action/clean-up level since the average soil concentration would be approximately 200 ppm in the top 12 inches. By tilling and discing to 12 inches the volume of contaminated soil above the action/clean-up level may have doubled.

3. Reduction in Contaminant Concentration - Tilling and discing is only effective in reducing surface contaminant concentrations if the underlying soils are lower in concentration. Soil data at the site is limited to a depth of 12 inches. As we have discussed in our October 19 memorandum to you, recent soil data indicate that arsenic contamination is still present at a depth of 12 inches and is highly variable in concentration, similar to the high variation observed at the surface and 6 inch depth. At shallow depths of 6 inches and 12 inches it was determined that subsurface concentrations exceed surface concentrations approximately 26% of the time. The profile of contamination below the 12 inch depth cannot be predicted with any significant degree of confidence. Thus, a reduction in contaminant concentration resulting from tilling at depths greater than 12 inches cannot be demonstrated.

The effective tilling depth has not yet been determined. However, it has been determined from operating experience at a local landfarm that the maximum depth for deep tilling is approximately three feet. In addition, the recommended tilling depth for common root crops is two feet. While these depths may be achievable, the tractor required for deep tilling is generally a D-8 Caterpillar or similar, which would be unwieldy at most locations in a residential area. The depth to utilities such as power, water, sewer lines and other hazards would have to be determined prior to deep tilling. For tighter areas, a common garden rototiller could be used, but the effective tilling depth would be limited to approximately one foot.

4. ROD Review - Our review of all Federal ROD summaries from 1982 through 1989 and the EPA ROD system database did not reveal any precedent for the use of tilling and discing to mix contaminated surface soils with less contaminated subsurface soils. The review also included the 17 ROD abstracts which you previously transmitted to us. When included in selected remedies, tilling is commonly used either in-situ or on stockpiled soil to provide aeration of volatile organic compounds or to enhance microbiological activity during bioremediation of organics.

At the Byron Johnson Salvage, Illinois, site the selected remedy included tilling to provide adequate in-situ mixing after the addition of reagents for cyanide reduction. However, as discussed in Item 1 above, mixing of reagents is not applicable to the Ruston site.

Alternative technologies evaluated as part of the Anaconda Smelter/Mill Creek, Montana, RI/FS included deep tilling of contaminated surface soil. The pilot study has been requested for additional information. Four tilling techniques were evaluated, resulting in surface soil metals reduction between 30% and 86%, which was not adequate to reduce exposure risks to acceptable levels. Reductions in concentration at that site, however, would be largely dependent on the concentration profile present, which is site specific. Profile comparisons between Ruston and Mill Creek cannot be made without pilot study data.

In addition to RODs, the EPA-sponsored Alternative Treatment Technology Information Center (ATTIC) database was searched for information on the use of tilling and discing as a remedial alternative. No information was referenced by ATTIC.

5. Similarities With Sodding Alternative - Another alternative being evaluated in the draft FS is the containment of contaminated soil using sodding. As part of our detailed evaluation of this alternative, sodding was determined to require tilling for surface soil preparation. Some clean fill and supplemental soil amendments would be required. Similarly, for the tilling and discing alternative, some clean fill, supplemental soil amendments and revegetation, such as sod, would likely be required. Thus, the actual differences between the sodding and tilling and discing alternatives are minimal. Since EPA policy and guidance for an FS is to evaluate a range of distinctly different alternatives, we recommend that tilling be deleted as a separate alternative because it is so similar to the sodding and capping alternative.

We believe that sufficient justification remains to discontinue our evaluation of tilling and discing. Please let us know if you concur with the elimination of tilling and discing from the screening of technologies section of the FS.

Ms. Mary Kay Voytilla
Proposed Omission of Tilling and Discing
November 16, 1990
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Please do not hesitate to call Dale Obenauer at (415) 768-0891 or me at (415) 768-7256 if
you have any questions or comments.

Sincerely,

A handwritten signature in cursive script that reads "Greg R. Haskins".

Greg Haskins
Project Manager

GH:DO:sfj